

Amendments to the Claims

The listing of claims will replace all prior versions, and listings of claims in the application.

1. (Currently Amended) A satellite communication system, comprising:
a satellite earth station operably coupled to at least one data network; and
a plurality of satellite modems, each satellite modem ~~of the plurality of satellite modems communicating in an upstream and a downstream data communication mode~~ configured to communicate with the satellite earth station via at least one servicing satellite,

wherein the satellite earth station includes:

a host processor configured to receive data packets from the at least one data network and processing ~~Data Over Cable Service Interface Specification (DOCSIS) management packets,~~

a ~~DOCSIS~~ Data Over Cable Service Interface Specification (DOCSIS) Media Access Control (MAC) ~~coupled to the host processor configured to encrypt a transmit packet data from a host memory, to frame data in MAC headers, and to insert MAC timestamps in the transmit packet data,~~ to format the data packets into one or more Moving Picture Experts Group (MPEG) frames,

a satellite modulator coupled to the DOCSIS MAC configured to modulate ~~an encrypted transmit packet data~~ the one or more MPEG frames based upon a selected modulation scheme from among a plurality of modulation schemes and a selected code rate from among a plurality of code rates to ~~generate~~ provide downstream

output data for transmission to at least one of the plurality of satellite modems, the satellite modulator including:

~~a burst demodulator coupled to the DOCSIS MAC configured to demodulate upstream input data to generate demodulated data, and~~

a plurality of queues, each queue configured to store the one or more of the MPEG frames based upon a modulation scheme and a code rate to provide a queue block of data, the plurality of queues being configured such that each queue corresponds to a possible combination of modulation scheme and code rate among a plurality of possible combinations of modulation schemes and code rates,

a multirate turbo encoder configured to receive the queue block of data from a selected queue from the plurality of queues and to encode the queue block of data using the code rate associated with the selected queue to provide an inner encoded data block,

a modulator configured to modulate the inner encoded data block using the modulation scheme rate associated with the selected queue to provide the downstream output data.

~~a turbo decoder coupled to the burst demodulator and the DOCSIS MAC configured to decode the demodulated data from the burst demodulator and to send decoded data to the DOCSIS MAC, wherein the DOCSIS MAC sends DOCSIS management packets portion of the decoded data to the host processor and sends transmit packet data portion of the decoded data to the at least one data network.~~

2. (Currently Amended) The satellite communication system of claim 1, wherein the data network ~~is the~~ includes an Ethernet network.

3. (Currently Amended) The satellite communication system of claim 1, further comprising:

~~an RS a Reed-Solomon (RS) encoder Decoder configured to correct errors of the decoded signal from the turbo decoder to receive the queue block of data from the selected queue and to encode the queue block of data using the code rate associated with the selected queue to provide an outer encoded data block, wherein the multirate turbo encoder is configured to receive the outer encoded data block and to encode the outer encoded data block using the code rate associated with the selected queue to provide the inner encoded data block.~~

4. (Currently Amended) The satellite communication system of claim 1, wherein the DOCSIS MAC comprises:

a SPI controller configured to support ~~[[a]]~~ at least one downstream channel ~~and at least one upstream channel;~~

an encryption engine configured to encrypt ~~the downstream data~~ the data packets to provide encrypted data packets;

~~a decryption engine configured to decrypt the upstream data;~~

an insertor to frame the one or more encrypted data packets in MAC headers to provide encapsulated data packets;

a timing generator configured to insert DOCSIS time stamps in the encapsulated data packets MPEG frames at programmable intervals to provide stamped data packets;
and

a formatter configured to format ~~downstream data~~ the stamped data packets into ~~Motion Picture Expert Group (MPEG)~~ the one or more MPEG frames; and frames.

~~a timing generator configured to insert DOCSIS time at programmable intervals.~~

5. - 28. (Cancelled)

29. (New) The satellite communication system of claim 1, further comprising:

a serial to parallel interface configured to format the one or more MPEG frames into one or more parallel MPEG frames, the satellite modulator being configured to modulate the one or more parallel MPEG frames based upon the modulation scheme and the code rate.

30. (New) The satellite communication system of claim 29, wherein the serial to parallel interface is configured to format the one or more MPEG frames into a byte wide stream.

31. (New) The satellite communication system of claim 1, further comprising:

a randomize unit configured to randomize the queue block of data from the selected queue to provide a randomized queue block of data, wherein multirate turbo

encoder is configured to encode the randomized queue block of data using the code rate associated with the selected queue to provide the inner encoded data block.

32. (New) The satellite communication system of claim 1, further comprising:
a block header insert module configured to insert a block header into the an inner encoded data block.

33. (New) The satellite communication system of claim 1, further comprising:
a second modulator configured to module the downstream output data to an intermediate frequency (IF).

34. (New) The satellite communication system of claim 1, wherein the plurality of modulation schemes includes at least one of a group consisting of:

quadraphase-shift keying (QPSK); and
8 Phase-Shift Keying (8PSK).

35. (New) The satellite communication system of claim 1, wherein the plurality of code rates includes at least one of a group consisting of:

1/2;
2/3;
3/4; and
5/6.

36. (New) The satellite communication system of claim 1, wherein the multirate turbo encoder is configured to appended one or more tailing symbols (TS) to the inner encoded data block, the one or more tailing symbols (TS) being used to drive the inner encoded data to a known state for proper decoding.

37. (New) The satellite communication system of claim 1, wherein the queue block of data is part of a plurality of queue blocks of data, the satellite modulator being configured to group one or more of the plurality of queue blocks of data to provide a superframe.

38. (New) The satellite communication system of claim 37, wherein the one or more of the plurality of queue blocks of data are taken from two or more queues from the plurality of queues, each of the two or more queues from the plurality of queues being associated with a different modulation scheme and a different code rate.

39. (New) The satellite communication system of claim 1, wherein the satellite modulator is configured to append one or more map messages (PHY-MAPs) to the superframe to provide the downstream output data.

40. (New) The satellite communication system of claim 39, wherein the one or more PHY-MAPs specify the modulation scheme and the code rate for each of the queue blocks of data from the superframe.